PATENT

#8
4,18998

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
DelDuca et al.
Serial No.: 08/763,719

Filed: December 13, 1996

For: MODIFIED ATMOSPHERE PACKAGE

Group Art Unit: 1306

Examiner: Drodge, J.

Atty. Dkt. No.: PCOA673/BLM

§ 1.131 Declaration of
Gary DelDuca, Alan Deyo, Vinod Luthra, and Wen Wu

Assistant Commissioner for Patents
Washington, DC 20231

We, Gary DelDuca, Alan Deyo, Vinod Luthra, and Wen Wu, hereby declare that:

1. We are employed by Tenneco Packaging Inc., assignee of the above-referenced patent application.

2. We jointly invented the subject matter claimed in claims 1-15 of the above-referenced patent application in the United States of America before October 16, 1995, the effective date of U.S. Patent No. 5,667,827 to Breen et al. ("Breen"). The acts relied upon to show conception and reduction to practice were carried out in the United States of America.

3. The attached invention disclosure document entitled "Information for Patent Consideration" (Exhibit A) is dated prior to Breen's effective date and is relied upon to show conception and reduction to practice of the invention of claims 1-15 in the United States of America prior to Breen's effective date.

4. Under a section entitled "Description of Concept" on the document's first page, the document describes the invention conceived by us. First, the document states that the

package concept includes a polystyrene foam tray holding a retail cut of meat and overwrapped with an oxygen permeable PVC stretch film. Typical PVC stretch film has a rate of oxygen permeability greater than about 1000 cubic centimeters per 100 square inches in 24 hours. The overwrapped foam tray is an "inner package" in accordance with the claimed invention. Second, the document states that the overwrapped foam tray is placed in an individual bag made of plastic with high oxygen barrier properties. The barrier bag is an "outer package" in accordance with the claimed invention. Third, the document states that prior to sealing, the barrier bag is flushed with appropriate gases, typically nitrogen and carbon dioxide, to lower the oxygen level in the bag to approximately 2% or less. This statement corresponds to the requirement of the claimed invention that the outer package is substantially free of oxygen therein solely in response to the outer package being flushed with one or more gases. Fourth, the document states that prior to sealing, an oxygen absorbing material is placed in the barrier bag or integrated into the plastic used to form the bag to further lower the oxygen level to 0.5% or below. This oxygen absorbing material is an "oxygen scavenger" in accordance with the claimed invention. Fifth, the document states that in a laboratory experiment, a barrier bag was filled with a meat tray, an oxygen scavenger, a water saturated paper blotter to add humidity, and flushed with a mixture of nitrogen and carbon dioxide before sealing. The water saturated paper blotter is an "oxygen uptake accelerator" for activating the oxygen scavenger in accordance with the claimed invention.

5. Under a section entitled "Data and Related Information" on the document's third page, the document refers to laboratory experiments conducted prior to Breen's effective date. The laboratory experiments demonstrate that the invention will work for its intended purpose

and, therefore, establish reduction to practice of the invention prior to Breen's effective date. The document states that laboratory experiments were performed to demonstrate the feasibility of the system. The document goes on to briefly describe the laboratory experiments:

> Barrier bags, made of Mobil 110 AXT OPP barrier film laminated to 1.5 mil polyethylene sealant were formed on the Tech Center Hayssen brand Form/Fill/Seal machine. The bag was filled with a Mobil 2S meat tray, a Multiform Desiccants, Inc. oxygen scavenger (of various formulations and capacities), a water-saturated paper blotter to add humidity, and flushed with a mixture of Nitrogen and Carbon Dioxide before sealing.

The above-referenced barrier film has a rate of oxygen permeability less than about 0.1 cubic centimeters per 100 square inches in 24 hours. The document then describes the results of the experiments:

> The internal atmosphere of the resultant package was sampled at regular intervals. The atmosphere was seen to be at initial 02 levels of 1.5 - 2.0%. After time periods ranging from 2 to 24 hours the 02 level in the package dropped to 0 parts per billion. In addition, samples measured 2 weeks later continued to show 0 PPB of oxygen.

6. In the attached interoffice correspondence entitled "Packaging Lab Evaluation Oxygen Scavengers" and the attached test results (Exhibit B), which are both dated prior to Breen's effective date, the laboratory experiments are described and shown to be a success. While we have continued to perfect the invention with an eye toward commercialization, the laboratory experiments demonstrate that the invention will work for its intended purpose.

7. In view of the invention disclosure document, interoffice correspondence, and test results, there was conception and reduction to practice of the claimed invention prior to Breen's effective date.

We hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

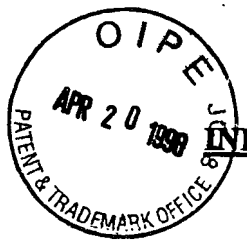
Gary R. DelDuca — Date: 4/13/98

Alan E. Deyo — Date: 4/9/98

Vinod K. Luthra — Date: 4-9-98

Wen P. Wu — Date: 4/9/98

Exhibit A



INFORMATION FOR PATENT CONSIDERATION
MCC PLASTICS DIVISION

To: A.J. McKillop
Mobil Oil Corp., OPC
Attn: L.G. Wise

cc: M.D. Keen (OPC)
V.K. Luthra
W.D. Sheehan
Tech Center Library
TOISRS file
W.P. Wu

Fr: G.R. DelDuca
V.K. Luthra

TITLE:
Modified Atmosphere Packaging System to Extend Shelf Life of Raw Meats

DESCRIPTION OF CONCEPT:

This concept describes an integrated packaging system to extend the time between cutting and purchase of retail cuts of raw meat. This concept uses commercially available technologies to provide an extremely low oxygen environment (less than 0.5%) for the retail meat cut. The package concept consists of:

1. Retail cut of meat placed in a standard polystyrene foam tray and over wrapped in the usual way or in an inert gas environment with an oxygen permeable PVC stretch film.
2. Wrapped retail cut is placed in an individual bag made of plastic with high oxygen barrier properties and formed on a high speed Form/Fill/Seal machine.
3. Prior to sealing, the partially formed bag is flushed with the appropriate gases, typically Nitrogen and Carbon Dioxide, which lowers the oxygen level in the bag to approximately 2% or less.
4. Also, prior to sealing, an oxygen absorbing material is placed in the bag or the bag can be made with special oxygen absorbing materials added to the plastic to further lower the oxygen level to 0.5% or below.

The individual packaged cut is then shipped to the retailer for sale. Individual bags are cut open and the retail cut placed for sale as needed. Removal of the meat package from the barrier bag causes the meat to 'bloom' to a red color upon exposure to normal air.

POSSIBLE NOVELTY:

Modified Atmosphere packaging for raw meats presently exists as high oxygen packages or extreme low oxygen packages.

This concept deals with a system to provide an extremely low oxygen package.

Systems presently in use to obtain extremely low O2 levels all rely on evacuation techniques.

Typically a package, whether of flexible materials or rigid trays, is placed in an evacuation chamber. A vacuum system removes as much of the atmosphere surrounding the package as possible. At this point the package can be sealed and the meat maintained in a "zero" atmosphere environment (commonly called vacuum packaging) or is then refilled with a gas or mixture of gases to provide a modified atmosphere. The major disadvantages to this system are very low speed, (cycle rates are typically less than 6 per minute) and difficulty removing any air inside of a previously wrapped package such as a over wrapped meat tray. This trapped air raises the residual O2 level of the package and can also cause billowing and then damage to the package during evacuation.

This, therefore, leads to the use of special meat packaging systems such as barrier trays with sealable lids and also multiple packages in a single evacuated bag in order to increase machine output.

The novelty of this concept is that it does not use evacuation techniques to reduce to extreme low O2 levels. Instead, commercially available Form/Fill/Seal overwrappers are used. This use of Form/Fill/Seal wrapper is particularly what differentiates this system from U.S. Patent 3,574,642 (Weinke). The Weinke system also uses a barrier bag, however the bag is subjected to vacuum and may or may not be re-gassed.

Form/Fill/Seal equipment used in the Mobil process uses a gas flushing technique to displace normal air. This technique is common in the package of dry food stuffs such as potato chips and cookies.

Gas flush, by itself, typically lowers the O2 level of the package to approximately 2% or higher. It does, however, allow for relatively high cycle rates, typically 150 packages per minute. The high cycle rate allows for individual cuts of meat to have their own Modified Atmosphere package. This reduces the number of packages which must be sold once the meat is removed from the bag.

The use of gas flush does not typically reduce the O2 level low enough for extended package shelf life (<0.5%). Therefore an oxygen scavenging packet or label is added prior to sealing the bag. The O2 scavenger absorbs the remaining O2 in the barrier bag and the air trapped beneath the O2 permeable PVC film used in the initial meat/tray wrap.

This allows the O2 level to drop to extreme low levels without evacuation techniques; allows the use of the common polystyrene foam tray that has high consumer acceptance; allows for simple, commercially available Form/Fill/Seal equipment to be used; allows for individual retail cuts placed in a single modified atmosphere bag to cut in-store waste; allows for the continued absorption of O2 as it permeates through the barrier bag; and allows for a high speed, minimum cost packaging system.

This packaging system is unique in that it integrates several disparate technologies into a unique system for low oxygen modified atmosphere packaging.

DATA AND RELATED INFORMATION

Laboratory experiments have been performed in the Tech Center and Canandaigua Pilot Plant to demonstrate the feasibility of this system.

Barrier bags, made of Mobil 110 AXT OPP barrier film laminated to 1.5 mil polyethylene sealant were formed on the Tech Center Hayssen brand Form/Fill/Seal machine. The bag was filled with a Mobil 2S meat tray, a Multiform Desiccants, Inc. oxygen scavenger (of various formulations and capacities), a water saturated paper blotter to add humidity, and flushed with a mixture of Nitrogen and Carbon Dioxide before sealing.

The internal atmosphere of the resultant package was sampled at regular intervals. The atmosphere was seen to be at initial O2 levels of 1.5 - 2.0%. After time periods ranging from 2 to 24 hours the O2 level in the package dropped to 0 parts per billion. In addition, samples measured 2 weeks later continued to show 0 PPB of oxygen.

Results of this testing are contained in written form in a file kept by G. DelDuca.

POSSIBLE SIGNIFICANCE TO MOBIL:

The development of a low cost, user friendly, high speed modified atmosphere packaging system allows Mobil to pioneer the technology of extended shelf life packaging of raw meats. This allows Mobil to sell barrier OPP film from our Films Division, protects our current polystyrene meat tray business, and allows us the opportunity of increased trays sales into this emerging field.

LABORATORY NOTE BOOK REFERENCE:

The original concept is documented in V. Luthra's Lab Notebook # 21, page 58 to 60 dated [redacted] Witnessed and understand by J. Thompson and S. Goulette both of Rigid Packaging R&D.

Testing data is documented in a file kept by G. DelDuca.

Submitted By:

Vinod K. Luthra _____ Date _____

Gary R. DelDuca Gary DelDuca Date [redacted]

Read and Understood by:

Witnessed by: _____ Date [redacted]

Witnessed by: _____ Date [redacted]

100gdd
10/03/95

Exhibit B

INTEROFFICE CORRESPONDENCE
FILMS DIVISION

[redacted]

G. Delduka

cc. T. Clark
R. Schoonerman

Packaging Lab Evaluation
Oxygen Scavengers

We have completed the oxygen uptake testing you had outlined to finalize the screening portion of this experiment. I would consider the test a success, and the scavengers appear to have worked as predicted. Future activity may include varying scavenger size, and/or moisture level in package headspace to optimize performance.

Two additional data points were added at 6 hrs and 25.5 hrs, by testing an empty bag. This action was initially taken due to observed O2 uptake due to predicted off gassing in the "tray only" variable. We wanted to confirm that the integrity of the package itself had not been compromised. All was well.

To review, the packages were produced on a Hayssen Ultima VFF&S wrapper, equipped with geartooth (horizontal pattern) crimpers. The packaging film was a lamination of Mobil 110 AXT/1.5 Mil 080 Metallocene sealant from Cypress Packaging. Nitrogen was introduced from the Praxair membrane unit, whereas, CO2 was supplied from a cylinder. Concentration levels of the gases could not be confirmed without the CO2 analyser, but retained O2 levels of 1.8%, or less, were successfully maintained.

Please let me know your thoughts on the attached data, and how you might like to proceed with further evaluations.

Rick

Rick Rehkugler

Oxygen Uptake: %
Illinois Instruments Analyser
110 AXT/1.5 080 Metallocene
Packaged 10:30 AM [redacted]

Time	**Package Variable**			
	Tray Only	100cc Scavenger	200cc Scavenger	Empty Bag
0	<1.5	<1.5	<1.5	
1.5 hr	1.50	1.40	2.3	
3 hr	2.97	1.76	2.86	
5 hr	3.11	2.07	1.62	
6 hr	3.23	2.22	3.18	1.38
19.5 hr	3.31	0.03 ppb	0.79	
21.5 hr	3.56	141.2 ppb	0.51	
23.5 hr	3.49	0.37	892 ppm	
25.5 hr	3.37	0.00 ppb	0.00 ppb	1.59

Note - All values denoted as % unless otherwise noted.

All readings % CO2 / O2 ppm or ppb

Time	100cc MRM	200cc MRM	200cc R
9:00 am			samples made
10:00 am	samples made /310ppm		
10:30 am	/252ppm	samples made	
12:00 pm	92% /415ppm 92% /370ppm	91.9% /795ppm 92% /0 ppb*	92% /50ppb
1:00 pm	90.4% /395ppm 90.7% /0 ppb	90.6% /0 ppb 91.5% /0 ppb	92% /0 ppb 92.2 /0.2 ppb
2:00 pm	91.8% /0 ppb* 91.8% /0 ppb*	92.6% /410ppm 92.5% /0 ppb*	93% /0 ppb 93% /0 ppb
3:00 pm	89.4% /0 ppb* 89.6% /0 ppb*	88.9% /0 ppb* 89.3% /653 ppm	90.5% /0.1 ppb 90.7% /0.1 ppb
4:00 pm	87.2% /0 ppb* 87.9% /0 ppb*	87.2% /400 ppm 87.5% /0 ppb	87.4% /0.1 ppb 87.8% /0.1 ppb
5:00 pm	88.5% /0 ppb* 88.8% /0 ppb*	88.5% /0 ppb* 88.9% /560 ppm	89.2% /15 ppb 89.3% /0 ppb
6:00 pm	88% /0 ppb* 88% /0 ppb*	87.5 /0 ppb* ! 88.4% /685 ppm !	88.6% /0 ppb 89% /0 ppb
7:00 pm	87.6% /1200ppm 87% /0 ppb*	! 88% /722 ppm ! 87% /0 ppb*	89% /0.1 ppb 89.3% /0 ppb
8:00 pm	88.8% /0.1 ppb	85.7% /720 ppm	88.8% /0 ppb 89.2% /0 ppb
[redacted] 7:30 am		! 88.4% /685 ppm ! is now 91% /0 ppb* ! 88% /722 ppm ! is now 90.5% /0 ppb*	

* indicates package is "puffed up"
1) Type MRM scavengers steamed 30 seconds
2) Boiling water used with blotter paper with type MRM
3) Visible moisture inside MRM packages within 15 minutes
4) Type R in package alone